See commentary by O'Hara

Peer-Delivered Cognitive-Behavioral Therapy for Postpartum Depression:
A Randomized Controlled Trial

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ABSTRACT

Objective: To determine if a 9-week group cognitive-behavioral therapy (CBT) intervention delivered by women who have recovered from postpartum depression (peers) can effectively reduce symptoms of postpartum depression (PPD) and anxiety and improve social support and the mother-infant relationship.

Methods: A sample of 73 mothers living in Ontario, Canada, were randomized into experimental and waitlist control groups between March 2018 and February 2020. Participants were ≥ 18 years of age, had an infant < 12 months old, were fluent in English, and scored ≥ 10 on the Edinburgh Postnatal Depression Scale. The experimental group completed the 9-week group CBT intervention immediately after study enrollment, while the control group did so after a 9-week waiting period. All outcomes were assessed at enrollment (n = 54) and 9 weeks later (n = 38). Outcomes were assessed in the experimental group at 6 months to assess treatment stability.

Results: Peer-delivered group CBT for PPD led to clinically and statistically significant improvements in symptoms of depression ($F_{1,47} = 22.52$, $P < .01$) and anxiety ($F_{1,45} = 20.56$, $P < .05$) in the experimental group, and these improvements were stable at the 6-month follow-up. Perceptions of impaired mother-infant bonding ($t_{15} = 3.72$, $P < .01$) and rejection and pathological anger ($t_{15} = 3.01$, $P < .01$) also decreased at the 6-month follow-up in the experimental group.

Conclusions: Peer-delivered group CBT for PPD effectively treats symptoms of PPD and anxiety and may lead to improvements in the mother-infant relationship. This intervention is an effective and potentially scalable means by which access to a treatment that meets the needs and wants of mothers with PPD can be increased.

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Postpartum depression (PPD) affects up to 1 in 5 mothers and can have profound effects on them and their families.[1,2] Even though PPD increases the risk of future depressive episodes, parenting problems, and emotional, behavioral, and cognitive difficulties in offspring,[3–8] just 15% of mothers with PPD receive evidence-based care.[9,10] Although primary health care providers routinely see women in the puerperium, they often lack the time and expertise to provide the treatment most women prefer: psychotherapy.[11–13]

Barriers to the receipt of evidence-based care include mothers' reluctance to disclose symptoms for fear of being misunderstood or judged,[13] lengthy waitlists for specialized psychiatric services,[14–16] the high costs of private psychotherapy,[16,17] and a lack of compliance with more accessible options like computerized psychotherapy.[18,19]

Peer-administered interventions (PAIs), those delivered by former sufferers, are increasingly recognized as alternatives to traditional mental health services and can overcome some barriers to PPD treatment.[12,20–22] They capitalize on the number of women who have experienced PPD and the fact that levels of therapist training may not predict psychotherapy effectiveness.[23,24] Studies examining the impact of PAIs for depression in general population samples suggest they have the biggest impact if they are structured and utilize evidence-based treatments (eg, CBT).[20]

Women who have recovered from PPD are an approachable and empathic source of support and experiential knowledge.[25–28] If trained to deliver structured evidence-based psychotherapies, peers could improve treatment access and uptake,[20] reduce stigma,[21,29] and broaden social networks.[30] Participation in group-based interventions during the perinatal period can be particularly helpful as they foster feelings of support and connectedness[31] and can lead to reductions in PPD symptoms.[32,33]

Studies of peer-based interventions for PPD have been undertaken, but these are not widely used clinically. Unstructured, individual, telephone-based peer support reduced PPD symptoms in one study,[34] while another trial of one-on-one peer support in home visits[35] did not. A recent trial of a psychosocial intervention delivered in pregnancy by community-dwelling women in rural India[19] led to no differences in depression symptom severity between

Clinical Points

- Despite the substantial burden posed by postpartum depression (PPD) to mothers and their children, the health care system struggles to address mothers' treatment needs and preferences.
- Peer-delivered group cognitive-behavioral therapy can lead to improvements in depression and anxiety among women experiencing PPD.

intervention and control groups. The same intervention was used in a randomized controlled trial (RCT) in rural Pakistan, where it led to modest improvements in PPD symptoms that did not persist 6 months later.[36] In both studies, women were from the community, but had not necessarily experienced PPD.

The primary objective of the present study was to determine if a 9-week group CBT intervention delivered by women who had previously recovered from PPD can effectively reduce PPD in current sufferers. Secondary objectives included examining its impact on maternal anxiety, social support, and the mother-infant relationship.

METHODS

Trial Design

Mothers living in the city of Brantford, Ontario, Canada, and outlying areas were recruited between March 2018 and February 2020 into this one-site RCT with experimental and waitlist control groups. This study took place between March 2018 and February 2020 (ClinicalTrials.gov identifier: NCT03285139). Participants were randomized in a 1:1 ratio to receive the 9-week intervention at enrollment (experimental group) or 9 weeks later (waitlist control group). Mothers in both groups could receive usual care (eg, medication, psychotherapy) during the study. No changes to study methods were made after study commencement. It received ethical approval from the Hamilton Integrated Research Ethics Board, and all participants provided informed consent.

Data were collected at study enrollment (T1), 9 weeks post-randomization (T2), and 6 months later (T3). Data were collected electronically using REDCap.[37,38]

Participants

Women were recruited via online advertising (ie, Facebook), our community partner, local health care providers, or self-referral. Participants were ≥ 18 years old, had an infant < 12 months of age, were fluent in English, and had an Edinburgh Postnatal Depression Scale (EPDS)[39] score ≥ 10. They had to be free of bipolar, psychotic, or current substance use disorders per the Mini-International Neuropsychiatric Interview (MINI).[40] Eligibility was determined by EPDS cutoff to optimize uptake and maximize generalizability since up to 30% of mothers have these levels of symptoms.[41]

Intervention

The 9-week peer-delivered intervention was based on a previously developed and validated program.[42,43] Weekly 2-hour sessions were delivered by 2 peer facilitators. The first half of each session involved instruction and practice of core CBT skills, followed by 1 hour of unstructured discussion on topics relevant to those with PPD (eg, sleep, supports).[40] Core cognitive skills (eg, cognitive restructuring) are introduced and practiced from week 1. Behavioral techniques (behavioral activation, relaxation, goal-setting) are introduced in week 2 and continue throughout. The 9-week intervention was administered at a centrally located community center to maximize accessibility.

Peer facilitator recruitment/training. Peer facilitators had recovered from PPD and were identified via responses to social media advertising (ie, Facebook). Ten peers were selected after completing a written application and telephone interview and having depression/anxiety levels below clinical cut-offs (Beck Depression Inventory-II score < 17[44] and 7-item Generalized Anxiety Disorder scale [GAD-7] score < 10[45]) at recruitment.

Their training included 2 days of in-classroom instruction, participation in a 9-week observership of the CBT intervention delivered by 2 experienced therapists in a hospital setting (followed by a 1-hour discussion post-session), and the delivery of the intervention in pairs. An experienced therapist listened to session recordings and provided 1 hour of supervision to peer facilitators weekly.

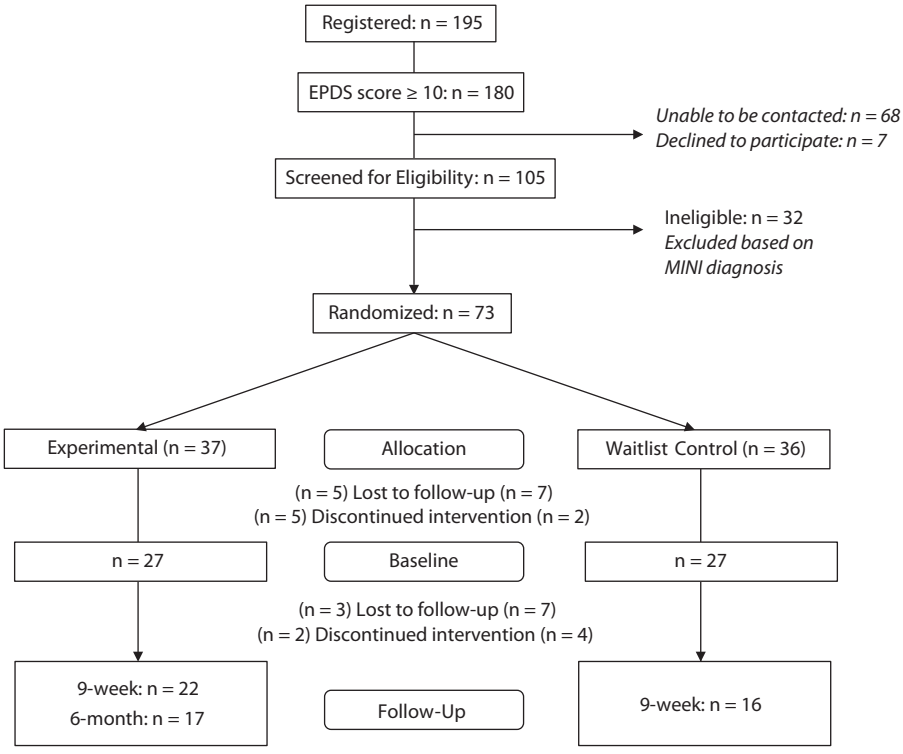
Outcome Measures

Participants' sociodemographic characteristics (eg, age, household income) and clinical data were self-reported. Participants provided data on our primary outcome (PPD) and the secondary outcomes anxiety (GAD-7), social support (Social Provisions Scale; SPS), and mother-infant relationship (Postpartum Bonding Questionnaire; PBQ) at T1 and T2. The experimental group provided data on these measures 6 months after study initiation (T3) to assess treatment stability. After completing the intervention (T2), participants also completed the Scale to Assess the Therapeutic Relationship-Patient (STAR-P).[46] This 12-item measure assesses the nature of the therapeutic relationship between participants and peers using 3 subscales: positive collaboration, positive clinician input, and non-supportive clinician input.

Our primary outcome (PPD) was assessed using the EPDS, a 10-item self-report scale.[47] A score ≥ 10 is indicative of possible depression.[39] The MINI was also administered to examine change in current major depressive disorder (MDD) diagnosis from T1 to T2.

Secondary outcomes included anxiety, which was assessed using the GAD-7,[48] a commonly used 7-item self-report scale measuring symptoms of generalized anxiety disorder, the most frequent comorbidity of PPD. Social support was measured with the SPS,[49] a 24-item self-report measure of the degree to which the social relationships within an individual's life provide support. Feelings of low

Figure 1. CONSORT Flow Diagram



Abbreviations: EPDS = Edinburgh Postnatal Depression Scale, MINI = Mini-International Neuropsychiatric Interview.

support and social isolation are common with PPD, and group-based interventions are potentially beneficial in the perinatal period because they increase social support and feelings of connectedness.[50]

Mother-infant relationship quality was measured using the PBQ,[51] a 25-item measure of disorders of the mother-infant relationship. It includes 4 subscales: impaired bonding, rejection and pathological anger, infant-focused anxiety, and incipient abuse.[51] Problems with mother-infant relationship quality are harmful potential consequences of PPD, but since some studies suggest that psychotherapy can improve mother-infant relationship quality,[52] it was assessed in this study.

Sample Size and Statistical Analysis

An a priori power analysis suggested that a sample of 74 women was adequate to detect a group-by-time interaction effect of medium effect size between treatment groups based on a type I error of 0.05 and 80% power.[20,43,53] Data analyses were conducted using SPSS version 26.[54] *t* Tests and χ^2 tests compared baseline sociodemographic and clinical characteristics between groups. We also examined predictors of loss to follow-up.

Outcome data were analyzed on an intention-to-treat basis in which all follow-up data were analyzed according to participants' randomization. Linear mixed effects models (LMMs) with restricted maximum likelihood estimation were used to examine the effect of the intervention. Data were structured as a 2-level hierarchy in which outcomes at T1 and T2 were nested within participants to examine the effect of the intervention between groups and over time. Group assignment was included as a fixed effect predictor to account for participants' being nested within CBT groups. Logistic regression assessed whether randomization increased the odds of (1) a clinically meaningful change from T1 to T2 in EPDS scores (≥ 4 points)[55] and (2) remission of current MDD at T2 among participants with MDD at T1. Finally, the Matthey Reliable Change Index (RCI) criteria for the EPDS[55] were also used to classify T1 to T2 score change into 4 categories: (1) "recovered": EPDS score decreased by ≥ 4 points and was < 10, (2) "improved (but not fully recovered)": EPDS score decreased by ≥ 4 points but had scores ≥ 10, (3) "deteriorated": EPDS score increased by ≥ 4 points, and (4) "unchanged": EPDS score decreased by < 3 points.

Treatment stability. To examine whether the effects of the intervention were stable in the experimental group, paired-samples *t* tests were conducted to compare means at T2 and T3 within the experimental group. The Pearson *r* was also used to define intervention effect stability.

RESULTS

Of 105 women screened, 73 met eligibility criteria and were randomized between March 2018 and February 2020 (Figure 1). Thirty-seven were randomized to the experimental group and 36 to the control group. The onset of

Table 1. Baseline Characteristics of Study Participants[a]

Characteristic	Experimental Group (n = 27)	Waitlist Control Group (n = 27)
Maternal age, y	32.4 (4.3)	30.7 (5.0)
Household income, $CAD[b]	75,652.2 (22,120.8)	63,043.5 (22,850.3)
Marital status, n/total n (%)		
Single	0/27 (0)	4/25 (16.0)
Married/common-law	27/27 (100)	21/25 (84.0)
Infant age, mo	5.1 (4.4)	5.7 (3.2)
Infant sex, male, n/total n (%)	16/27 (59.3)	11/26 (42.3)
Parity, n/total n, %		
Primiparous	9/27 (33.3)	15/27 (55.6)
Multiparous	18/27 (66.7)	12/27 (44.4)
Ethnicity, n/total n (%)		
White	25/26 (96.2)	24/26 (92.3)
Not White	1/26 (3.8)	2/26 (7.9)
Education, y	15.0 (1.8)	14.1 (1.4)
Psychotropic medication use, n/total n (%)	10/26 (38.5)	5/23 (21.7)
Baseline EPDS score	16.0 (3.7)	16.8 (4.0)
Baseline GAD-7 score	12.6 (4.3)	11.8 (4.6)
Current major depressive episode (MINI), yes, n/total n (%)	19/27 (70.4)	17/26 (65.4)
Psychiatric comorbidity, yes, n/total n (%)	19/27 (70.4)	18/26 (69.2)
Total no. of MINI diagnoses	2.4 (1.5)	2.5 (1.7)

[a]Values are shown as mean (SD) unless otherwise noted. Data were missing for variables for which total n values shown are less than 27.
[b]Before tax.
*Abbreviations: EPDS = Edinburgh Postnatal Depression Scale, GAD-7 = 7-item Generalized Anxiety Disorder scale, MINI = Mini-International Neuropsychiatric Interview.

COVID-19 prevented us from recruiting our target sample of 74 participants. Fifty-four participants (74%) provided data at T1, 38 (52%) at T2, and 17 experimental group participants provided data at T3.

Baseline demographic characteristics did not significantly differ between groups (Table 1). Table 2 includes outcome means and effect sizes. At T1, the mean (SD) experimental group EPDS score was 16.0 (3.7), and 70.4% of participants (19/27) had current MDD. In the control group, the mean (SD) EPDS score was 16.8 (4.0), and 65.4% of participants (17/26) had current MDD. Generalized anxiety disorder (GAD; 58.3% [21/36]), panic disorder (38.9% [14/36]), and obsessive-compulsive disorder (27.8% [10/36]) were the most common comorbidities across groups. Of those without current MDD, the most common diagnoses were panic disorder (47.1% [8/17]) and GAD (29.4% [5/17]). At T1, 88.9% of participants (48/54) reported lifetime MDD. From T1 to T2, there were no changes in the number of mental health care visits and in psychotropic medication use in the experimental and control groups.

Peer facilitators were between 20 and 57 years old at recruitment and held a wide range of occupations (eg, administrative assistant, early childhood educator). Three had prior work experience in health care.

There were no differences in baseline characteristics of participants who provided data at T1 and T2, and those lost to follow-up. Eighty-four percent of participants (38/45) attended 5 or more of their 9 weekly sessions. Ten groups were delivered with a mean of 5 participants assigned to each group.

There was a significant group-by-time interaction for change in EPDS scores between T1 and T2 ($F_{1,44.22} = 13.74$, $P < .01$). We analyzed results separately by treatment group and found the main effect of time on EPDS scores was significant ($F_{1,47} = 22.52$, $P < .01$), and mean scores decreased by 5.4 after treatment in the experimental group. From T1 to T2, participants in the experimental group were 32 times more likely to experience a clinically significant improvement in EPDS scores (≥ 4 points) than control participants (OR = 32.14; 95% CI, 3.51 to 294.22). Those in the experimental group also had 9 times the odds of no longer meet diagnostic criteria for current MDD at T2 relative to control participants (OR = 9.00; 95% CI, 1.14 to 71.04).

Using the Matthey RCI criteria, 40.9% of experimental participants (9/22) were classified as recovered, 54.5% (12/22) as improved, and 4.5% (1/22) as deteriorated at T2. Among the control group, 6.3% of the participants (1/16) were classified as recovered, 31.3% of participants (5/16) as improved, 25.0% (4/16) as deteriorated, and 37.5% (6/16) as unchanged. These proportions differed between groups ($\chi^2_3 = 14.8$, $P < .01$).

Paired-samples *t* tests suggested that EPDS scores were not statistically significantly different from T2 (mean [SD] = 11.1 [4.4]) to T3 (10.6 [6.1]) in the experimental group ($t_{15} = 0.48$, $P = .64$). The Pearson correlation also showed that stability from T2 to T3 was high ($r = 0.81$, $P < .01$).

A statistically significant group-by-time interaction predicted GAD-7 scores between T1 and T2 ($F_{1,38.85} = 20.77$, $P < .01$). In the experimental group, the main effect of time on GAD-7 scores was also statistically significant ($F_{1,45} = 20.56$, $P < .01$), such that participants improved over time with mean scores decreasing by approximately 5.5 points at T2. A paired-samples *t* test showed that GAD-7 scores were not significantly different from T2 (mean [SD] = 7.56 [4.27], n = 16) to T3 (8.13 [4.87]) in the experimental group ($t_{15} = 0.82$, $P = .42$). Pearson correlation determined that stability from T2 to T3 was also high ($r = 0.83$, $P < .01$), suggesting that intervention effects were stable for anxiety as well.

There was no statistically significant group-by-time interaction to predict social support from T1 to T2, and SPS scores were not different from T2 to T3 in the experimental group. There were also no statistically significant group-by-time interactions predicting mother-infant relationship outcomes for any PBQ subscale from T1 to T2. However, scores on the impaired bonding subscale changed from T2 (mean [SD] = 10.81 [3.49], n = 16) to T3 (6.69 [4.06]) in the experimental group ($t_{15} = 3.72$, $P \leq .01$), as did scores on the rejection and pathological anger subscale (T2 (6.38 [2.66], n = 16), T3 (3.69 [3.32]; $t_{15} = 3.01$, $P \leq .01$).

STAR-P results also highlighted that participants experienced a high level of positive collaboration with their peer facilitators, (mean [SD] = 21.47 [2.92], total score = 24, n = 17), positive peer facilitator input (10.35 [2.03], total score = 12), and low levels of non-supportive peer facilitator input (11.24 [1.35], total score = 12).

Table 2. Outcome Means by Group and Treatment Effect Size

	Experimental Group				Waitlist Control Group				
	T1		T2		T1		T2		Hedges
Outcome	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	*g*[a]
EPDS score	16.0 (3.7)	27	10.6 (4.2)	22	16.8 (4.0)	27	16.8 (5.2)	16	1.2
GAD-7 score	12.6 (4.3)	25	7.1 (3.9)	22	11.8 (4.6)	25	12.6 (5.5)	16	1.3
SPS score	75.0 (12.5)	24	79.8 (9.3)	21	74.5 (9.4)	21	77.3 (7.9)	15	0.2
PBQ score									
IB subscale	12.8 (5.2)	25	11.3 (4.1)	22	15.0 (9.8)	22	13.9 (9.5)	16	0.1
RPA subscale	7.2 (3.8)	25	6.8 (2.7)	22	8.0 (5.8)	22	8.3(5.8)	16	0.4
IFA subscale	4.5 (2.3)	25	3.8 (1.8)	22	5.1 (4.7)	22	4.1 (3.4)	16	0.0

[a]Hedges *g* was calculated using the mean and standard deviation of change between T1 (study enrollment) and T2 (9 weeks post-randomization) in each group.
Abbreviations: EPDS = Edinburgh Postnatal Depression Scale, GAD-7 = 7-item Generalized Anxiety Disorder scale, IB = Impaired Bonding, IFA = Infant-Focused Anxiety, PBQ = Postpartum Bonding Questionnaire, RPA = Rejection and Pathological Anger, SPS = Social Provisions Scale.

DISCUSSION

The findings of this study suggest that peers can deliver effective group CBT to women currently struggling with PPD to produce statistically and clinically significant improvements in symptoms of depression and anxiety, effects that were stable up to 6 months. Nearly 95% of women in the experimental group reported recovery or improvement in PPD post-intervention. The intervention did not impact mothers' perceptions of social support. This lack of impact may be because CBT does not target social support directly (as interpersonal therapy [IPT] does). Peer-delivered group CBT for PPD did not affect the mother-infant relationship immediately post-treatment, but improvements were observed at 6-month follow-up, suggesting that the effects of treatment on this outcome may take more time to manifest.

The magnitude of treatment effect on PPD symptoms in the present study is similar to those found in previous treatment trials of IPT[56] and CBT[57] delivered by professionals. The effect of the current intervention may be larger than those for prior peer-delivered treatments for PPD[53] because it is based on an evidence-based treatment[20] and delivered in a group.[34–37] Not only does group therapy tend to be more cost-effective, it also has the added benefit of building networks of support, reducing stigma and shame. The strengths of the peer intervention are further highlighted by STAR-P results suggesting that participants experienced a mutual openness and trust with their facilitators and felt encouraged and listened to and that peer facilitators could empathize with them.

Peer-delivered group CBT also reduced symptoms of anxiety. Despite anxiety's being the most common comorbidity of PPD,[58] relatively little research has focused on its treatment in the perinatal period,[59,60] particularly in the context of PPD. The observed effects may be due to the fact that CBT is also an effective treatment for anxiety.[61]

We also found that intervention effects on depression and anxiety were stable up to 6 months post-randomization. Our use of a validated CBT protocol, participants' ability to access other treatments, and peer delivery could have contributed to the stability of our findings. Our results are consistent with those from studies of group psychotherapy for PPD delivered by professionals that found a continuation of treatment effects long-term.[32,33]

Despite this study's strengths, its limitations should be noted. Although we had sufficient statistical power to detect meaningful changes, our sample was relatively small. In keeping with the geographic region from which we recruited participants, there was little ethnic diversity, which could affect the generalizability of the results. That said, the sociodemographic characteristics of our sample were similar to those of other RCTs of PPD treatment conducted in higher-income countries.[50,62,63] Our study took place in Canada, where health care is universally available, which could limit the applicability of our findings to other countries. Participants in our study were permitted to access other mental health care resources, which could have influenced the observed findings. This study also encountered substantial loss to follow-up between study timepoints. However, our attrition rates were similar to those reported in other RCTs of treatments for PPD.[53–55] Additionally, the use of a waitlist control group (rather than placebo control) may have led to larger effects than had a different control group been used.[64] A waitlist control group was selected because placebo-controlled trials tend to be avoided in new mothers for ethical reasons, and evidence suggests that PPD is not characterized by a significant worsening of symptoms over 3 months.[65,66]

Another limitation is that we did not measure peer leaders' adherence to the CBT intervention delivery. Although our results suggest women benefited from the intervention, we did not assess the impact of fidelity to the CBT model on these outcomes. Lastly, we were unable to assess whether there were differential treatment effects based on peer facilitators, as individual peers were randomly assigned to deliver each group. Moreover, while peers were effective in reducing symptoms of PPD, it is not known if peer facilitators need to have experienced PPD to deliver the intervention effectively. For example, it is not clear that women who have suffered from depression at other points in their lives would have been more or less effective.

Future studies should examine the effectiveness of peer-delivered group CBT for PPD in larger trials and in

settings where universal health care may not be available. They should also assess cost-effectiveness and attempt to determine if peers can deliver effective group CBT for PPD in the absence of psychotherapy supervision. Given the impact of COVID-19 on treatment availability coupled with the challenges of accessing treatment in rural communities, the effectiveness of online delivery could also be investigated. If successful, virtual interventions could reduce further barriers to treatment and increase access to care.

Despite the substantial burden of PPD on women, children, and their families, the health care system currently struggles to address the treatment needs and preferences of many mothers. Peer-delivered group CBT for PPD has the potential to address these gaps, reducing waitlists and impacts on specialized psychiatric services. Not only does this intervention target the many barriers to PPD treatment, it also was designed with the needs and preferences of mothers in mind. This intervention therefore represents a special opportunity to foster a sense of community among women with PPD, with which feelings of isolation and stigma are common. Peer-delivered group CBT may be an effective and scalable means of addressing the limitations of existing health care systems to address PPD and has the potential to reach women who would otherwise not receive treatment, significantly improving outcomes for them, their families, and society.

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Editor's Note: We encourage authors to submit papers for consideration as a part of our Focus on Women's Mental Health section. Please contact Marlene P. Freeman, MD, at mfreeman@psychiatrist.com.